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TABLE OF CONTENTS

President's Column ---------- 3

Presentation of the Rudolf Schindler Award — 1960 ---------- 4

The History of Gastroscopic Color Photography ---------- 5
Harry Segal, M.D.

Progress in Gastroscopic Photography ---------- 7
Robert S. Nelson, M.D.

Symposium on Non-Surgical Management of Esophageal Disease ---------- 11

a. Moderator's Introduction
John T. Howard, M.D.

b. The Medical Treatment of Hiatal Hernia, Esophagitis, Esophageal Ulcer and Diffuse Spasm of the Esophagus
Asher Winklestein, M.D.
and
John T. Howard, M.D.

c. Treatment of Benign Stenosis of the Esophagus
Edward B. Benedict, M.D.

d. Cardiospasm and It's Treatment
Regis A. Wolf, M.D.

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This Bulletin is to be issued quarterly. Manuscripts should be directed to the Chairman of the Editorial Board. Rejected manuscripts will be returned, others remain the property of The Bulletin. Manuscripts should be typewritten, double spaced on 8½ x 11" paper with 1½ inch margin on both sides. Title and author's name should appear in the upper right hand corner of each page.

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President's Column

PAUL L. SHALLENBERGER, M.D.
President of the American Gastroscopic Society
Guthrie Clinic, Sayre, Pennsylvania

This issue of the Bulletin represents the 24th Bulletin published by the American Gastroscopic Society. Dr. Roy L. Sexton of Washington, D. C has been the long time editor and driving force behind its publication. Many others have been interested in the Bulletin and have worked hard in obtaining or writing articles and editing and abstracting papers. The problems concerned with this continuous publication have been many and varied and their solutions not always easy. Scientific material has often been difficult to obtain. No great effort has been made to make it into an advertising medium, but some advertising is necessary to underwrite the deficit. We have been most grateful for the help of many people who have donated a great deal of their time and generously of their finances. Mrs. Bruce Smith of Washington, D. C., a member of our Society and also a member of The Board of Trustees of The George Washington University Hospital has been most interested in this publication and has generously underwritten deficits on several occasions.

The distribution of the Bulletin, both in this country and abroad has been wide and its acceptance seems to have been very good. Continuous efforts over many years by the Admissions Committee, the Editorial Board, the officers, and the Board of Governors have been well rewarded in the past by the published material. Editorial accuracy, content choice, and subject selection have shown great improvement in recent years. We hope that this will and can continue. This Bulletin should be for exchange of ideas, reporting on experiences, new instruments or methods of examination, and improvement on present methods of endoscopy for the gastro-intestinal tract. This is only a small part of the broad field of medicine. Endoscopy reporting is a part of medical publication that is somewhat overlooked by the larger medical publications. This neglect has resulted in a large experience in many different hands throughout the world, but has not encouraged the transmission of information and experiences between individuals or groups.

If the method of gastroscopy is to survive, it will not depend on the education of the membership of our Society, who already are sufficiently interested in gastroscopy and esophagoscopy to continue this work, it will depend however, on the education of associated medical specialities, including the general practitioner, the internist and the radiologist who will call on the gastroscopists from time to time for interpretation of borderline conditions. The same education of the medical research specialist is needed if the method is to progress and continue.

The Bulletin has been walking a tightrope for some time. Following the World Congress all scientific material was turned over to a larger publication. This left the Bulletin without any material whatsover and interfered with contractual relations with advertising. When this material was returned, there was enough to begin again and the Bulletin had new life. The change of the name of the Society and therefore the name of the Bulletin which had been sold to advertisers and to its subscription lists generally, presented a new difficulty and so, a new rebuilding process was accomplished with effort.

Advertisers are not attracted to the publication because of its limited subscription list.

(Continued on page 10)

*THE PRESENTATION OF THE RUDOLPH SCHINDLER AWARD OF THE AMERICAN GASTROSCOPIC SOCIETY**

John Tilden Howard, Baltimore, Md.

Dr. Wirts, our medalists for 1960, fellow gastroscopists and our guests: Some of you may be interested to know that The Rudolph Schindler Award was established by The American Gastroscopic Society to honour its founder and first president, Dr. Schindler. He was the clinician who, with the optician, Georg Wolf, conceived the flexible gastroscope and so enabled physicians to inspect the interior of the stomach easily and safely. He it was, too, who popularized by preaching and teaching the simplicity of gastroscopy with the flexible instrument. With the help of a few of his early disciples, this Society was founded on Dr. Schindler's enthusiasm for the study of the gastric mucosa. If he were geographically closer than far-away Brazil, I know that he would be with us tonight and that he would have real pleasure in making the presentation of the prize which carries his name. He is surely with us in spirit.

The Award is given for unusual accomplishment in the advancement of the gastroscopic method. This year your Committee had no difficulty in deciding that the prize should be awarded for work in the field of gastroscopic photography, a challenging field in which several workers from time to time have made what might be called "token contributions," photographic devices and techniques that generally gave somewhat less than satisfactory pictures. To get sufficient light into the stomach and a sufficiently sensitive film was not easy. Yet, at long last, real progress in gastroscopic picture-taking has been made and tonight we wish to acknowledge the gastroscopists' debt to gastroscopic photographers and to do them honour. They have made it possible to show a picture in colour of a gastric ulcer or tumour with almost, though not quite, the same accuracy as these lesions are shown on a roentgen film. X-ray photography and gastroscopic photography are still complementary.

One would presume that *good* endoscopic photography should always command favourable attention and respect, since its value is so obvious. But at least once that was not the case and I'm rather glad and proud because we are recognizing the merit of the method tonight. It was endoscopic photography of the lower end of the gastro-intestinal tube that once received a few bruises in my presence at a medical meeting. In the autumn of 1940, I was a guest at a luncheon meeting of The Section on Allergy of the Southern Medical Association; it met in Louisville that year and the food — and drink — at The Pendennis Club had been particularly good. After the chairman had done a good deal of glass-tapping, he introduced the guest speaker, a gastroenterologist. This man, who was a real scientist, had studied gastrointestinal allergy in a not illogical way. Through the proctoscope, he had watched and photographed reactions of the rectal mucosa when extracts of different foods were applied to the rectal valves. His pictures were excellent but his conclusions weren't too satisfactory, if my memory serves me. The reactions were similar to the intradermal tests with proteins of foods, interesting but unreliable. As I was about to forget the inconclusive paper, an allergist rose as a discussor of it. He must have been the Will Rogers of The Section. How I wish that I could imitate him as he said that the diagnosis of allergy to foods was generally in a frightful state! How he hated to see a patient with presumptive gastrointestinal allergy enter his office! How unreliable skin testing with food proteins was! How much of his money and his technician's time had been wasted running the leukopoenic index! And in the same way he had been fooled by a fellow allergist's eosinophilic index. Someone had led him astray by advocating

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**Presented at the Annual Banquet, American Gastroscopic Society, New Orleans, La., March 30, 1960.*

roentgen studies of the bowel in children after the ingestion of certain foods. He had heard that the gastroscope, if the allergists would learn to use it, would show a stomach full of hives after an allergen had been put into that organ in a sensitized person. He doubted that, for he had tried intra-nasal testing and he'd given it up. He concluded that he would continue to do the best that he could with a dietary history. He'd be damned if he would buy a Buie table and a proctoscope with a camera so that he could record the effects of foods on the rectal valves. The practice of allergy, he said, was just becoming too damn complicated! There was great laughter and I felt sorry for the essayist, who had presented his pictures in all seriousness.

Such a paper, if it dealt with the photography of the interior of the stomach, would never be laughed down if it should be presented before this Society — even following a somewhat alcoholic luncheon. Good photography through the gastroscope at once excites our admiration and respect. How useful are good photographs of lesions for exhibition to the operating surgeon in confirmation of a diagnosis! How useful they are when they show a referring physician erosions which are bleeding! And how helpful such photographs are for teaching! Gastroscopic photography is not to be laughed at. It may not be rewarding to the allergist, but it is very useful to the internist, to the surgeon, and to the gastroenterologist.

Tonight we divide The Schindler Award for the first time in its history. Its recipients are two gastroscopic photographers. Dr. Harry Segal, a member of this Society for many years, is the *American pioneer* in this photographic field; he was the first person in this country who took in colour through the gastroscope really good pictures of the gastric mucosa. The co-recipient of our prize is Dr. Robert Nelson, who also is a member of our organization. I need not tell you how *he simplified and popularized gastroscopic photography* so that, with equipment which is not too costly, we have been able to obtain reasonably good pictures of the gastric mucosa and of its lesions. His pictures have been shown widely at our meetings and at the scientific sessions of similar societies. While every gastroscopist may not choose to be a gastric photographer, our medalists this year have opened the field to us.

Dr. Segal and Dr. Nelson, in recognition of your advancements of the gastroscopic method in the field of gastroscopic photography, I have the honour to present to you the certificates of The Rudolph Schindler Award and the cheques of the Society.

*THE HISTORY OF GASTROSCOPIC COLOR PHOTOGRAPHY**

Harry L. Segal, M.D.

My role in this symposium on gastroscopic color photography is merely to present its history briefly including the descriptions and results of the first successful system for taking gastroscopic color photographs.

From the Departments of Medicine, the Genesee, Strong Memorial and Rochester Municipal Hospitals, the University of Rochester School of Medicine and Dentistry, Rochester, New York.

**Presented at the Annual Meeting of the American Gastroscopic Society, Atlantic City, N. J., June 7, 1959.*

Before the introduction of the rigid gastroscope, Lange and Meltzung[1] in 1898 tried to photograph the inside of the stomach by introducing into that organ a small camera attached to a rubber tube.

Back, Heilpern and Porges[2] in 1929 using the idea of the internal camera developed an instrument resulting in the so-called "gastrophotor".

The external camera appeared after the development of the rigid gastroscope but Elsner's[3] photographs in 1926 were considered as un-

satisfactory. Henning and Wolf[4] in 1931 described the application of the external camera with the Schindler's rigid gastroscope.

However the first acceptable color pictures with the rigid gastroscope were reported by Henning and Keilhack[5] in 1937. The exposure time was between one-half and one second. Successful color photography with this combination was reported next by Guzlow[6] in 1939. These pictures were taken in dogs with gastric fistulae.

Henning and Wolf[5] in 1936 were the first to report the use of the external camera with the Wolf-Schindler Flexible Gastroscope. However their pictures were not consistently satisfactory.

Color pictures using the "gastrophotor" were recorded by Rafsky[7,8] in 1942 and 1943. The lesions photographed were first located within the stomach by the flexible gastroscope. The photographs obtained by this double instrumentation depicted the actual lesion in about 63 per cent of the patients so examined.

The first apparatus capable of achieving satisfactory color transparencies was introduced in 1947 by Watson, Segal and Weinberg.[9] More detailed studies with this system were reported by Segal and Watson.[10] The previous handicaps of color photography with the combination of the external camera and the flexible gastroscope due to poor light transmission were surmounted by the following steps each one of which multiplied progressively the amount of light finally reaching the photograph film:—

1. a flexible gastroscope, the glass-air surfaces of which have been coated with resulting light gain about four times;

2. construction of a gastroscope lamp normally operating at 25 volts which can be stepped up safely to 80 volts during the picture exposure time;

3. the development of a mechanism for adapting the camera to the gastroscope consisting of a spring-type coupling device, a periscope viewing tube and a floating support having universal motion;

4. construction of a power supply and synchronization control unit which contains a synchronous motor and cam-type discs to operate the lamp voltage, the periscope prism and the camera shutter in unison.

Using 35 mm. Type A Kodochrome with an exposure time of one-half second, the resulting picture diameter with this camera was 6 mm.

Good color reproductions of the endoscopic findings were obtained in more than 61 per cent of the exposures. However satisfactory transparencies could be obtained in most individuals by taking more than one exposure of each area.

Nelson[11] in 1956 reported a less complex system for taking color photographs. In his last report he describes the use of a reflex camera equipped with a foot switch for the control of the current with a simple bayonet attachment for coupling the apparatus to the gastroscope. Super-Anscochrome film with an exposure time of one-half second gave the best results.[12]

Debray and Housset[13] have recently introduced color gastroscopic photography with an electronic flash. The apparatus consists of a gastroscope, a camera and an electric generator wired and grounded appropriately to prevent injury to the patient or the operator. They have reported good results in 300 pictures taken in 80 patients.

Tasaka and Ashizawa[14] have reported their simplification and clinical application in over 3,000 cases of the internal Gastrocamera constructed in 1950 by Dr. Uji and the Olympus Optical Company.

With the present availability of faster film, the increased use of gastroscopic color photography with the present type of flexible gastroscope will depend upon the enthusiasm of the clinical gastroscopist and investigator. Further progress in the technique and application of gastroscopic color photography should occur when the gastroscopic examination is simplified further by the perfection of the gastric fiberscope

SUMMARY

The first acceptable color photographs of the inside of the stomach were taken in 1937 with the combination of an external camera and the rigid gastroscope. The first usccessful system as well as more recent modifications to achieve satisfactory color transparencies with the external camera and flexible gastroscope were described in 1948. Comments on the future possibilities of gastroscopic color photography were made.

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*PROGRESS IN GASTROSCOPIC PHOTOGRAPHY***

Robert S. Nelson, M.D.*

The color recording of images seen through the flexible gastroscope is now routine. As time goes on, refinements will continue to improve the various methods of photography now in use. Gastroscopists who record what they see are pardonably enthusiastic with the results of their efforts. The demonstration of the interior of the stomach to fellow endoscopists and to those doubtful of the method is a considerable step in confirming the value of gastroscopy to the medical profession in general.

OBJECTIVES

While it is important to be able to record and demonstrate what we have been observing for years, and while gastroscopic photography will show that it is possible to visualize pathology in an excellent fashion, the true objectives of the method should be defined among gastroscopists particularly and gastroenterologists generally. We feel that photography should be used routinely, just as the roentgenologist records images on film, and for the same purpose. The occasional passable photograph has only limited value. The test of the operator-photographer should use his ability to obtain pictures of any area he can visualize, at will. The degree of excellence of his photographs will be a strict test of clear visualization of the stomach. Our efforts and those of others have shown that various types of equipment will record the image seen on the proximal prism of the flexible gastroscope,[1,2,4,5] but the operator alone puts it there. Thus the ability to take color photographs with a reliable appartaus is a true test of endoscopic facility. As such, we have incorporated photography into the training of residents and postgraduate students. The correlation of photographs showing normal and abnormal fields with what is visualized during actual training accelerates proficiency.

Specific advantages of photography have already been outlined,[2] and only one will be mentioned. It is increasingly obvious that when the surgeon can be shown a gastric lesion in

*From the Department of Medicine, The University of Texas M. D. Anderson Hospital and Tumor Institute, Houston 25, Texas.

***Presented at the annual meeting of the American Gastroscopic Society, Atlantic City, N. J., June 7, 1959.*

color, he is much more impressed than when he reads a report. It is even possible that by showing the complete healing of a gastric ulcer by internal photographs we may be able to convince the most implacable champions of resection that some gastric ulcers can be trusted.

EQUIPMENT AND METHODS

Photographic equipment differs mainly in the type of lighting and degree of automation available to the operator. Our own apparatus has evolved from a group of parts requiring several helpers to the present compact reflex camera and regulatory foot switch requiring only the gastroscopist. We have found that the relatively simple tungsten lamp, used routinely in all gastroscopies, gives better lighting at 25 volts, and is no more difficult to pass. With the voltage double during exposure, it gives sufficient illumination with modern fast color film to record excellent pictures in a highly reliable manner, provided the operator has done his part. It is quite possible to overexpose film with this apparatus.

The electronic flash produces a superior illumination, and is undoubtedly fast enough to record all images without motion. We have not, however, met with the expected difficulties of motion interference within the stomach, and few of our photographs, even at 1 second exposures, have been spoiled by this factor. Those familiar with the electronic flash[1] state that the intensity of the discharge must be regulated for best results. While the intensity of our light is always at maximum, we have been able to adjust conditions by length of exposure and the use of improved film.

It has been our experience that successful gastroscopic photography is often a matter of taking advantage of "targets of opportunity," and that it is best, when an excellent field is obtained, to take a number of pictures in a rapid manner while conditions are optimum. All too often, and especially in the presence of pathology, reflux through the pylorus, heavy mucus clouding the objective, inability to retain insufflated air or restlessness of the patient may intervene to spoil the chance of a good exposure. We are able to take a series of photographs within 60 seconds or less, since there is no necessity to wait 10 to 20 seconds for electrical recharging of a generator.[1]

While we use an apparatus designed by us in collaboration with a commercial firm, the simplicity of the method is such that it is possible to construct the equipment in any well-equipped machine and electrical shop, using a good reflex camera. When adapting the camera, it is important to remove or to polish clear the ground glass in the reflex focusing mechanism, since it obstructs the view within the stomach. Our present apparatus is simple, safe, and relatively inexpensive — all important considerations for routine photography.

Whatever method is used, we feel that the advantage of being able to visualize the field clearly through the gastroscope at the time of exposure is absolutely necessary to routine and reliable recording of pathology. Photographs taken blindly by means of small intragastric cameras[6] may produce occasional brilliant results, but must, in the main, be an unreliable means to this end.

INTRAGASTRIC PHOTOGRAPHIC VARIABLES

As has been stated previously,[2] the good photographer must make an objective evaluation of his field. Bubbles within the stomach may be eliminated by the use of silicone preparations, but this will not eliminate thick mucus, and even good preliminary drainage does not permit freedom from accumulation of mucus or regurgitated material during the procedure. The clarity of the objective should be assured before each exposure, and vigorous wiping on the stomach wall is often necessary.

When the stomach lumen is constricted, as with spasm, tumor, or inability of the patient to hold air, more light or longer exposure will be needed. This is also true when the mucosa reflects light abnormally, as when there are heavy folds, old blood between the rugae, or atrophic changes. Highlights should be watched for, and eliminated as much as possible by taking the picture an an angle which reduces them to a minimum.

We compensate for poor reflection, constriction, or heavy shadows which may spoil the image by taking pictures of each field at

2 different exposure times. Since it is impossible to use an exposure meter, this method must suffice, and it has been surprisingly efficient in obtaining usable photographs, at the cost of some ruined film. Happily, it is seldom necessary, but should be used wherever there is doubt.

A standard principle is to take a number of exposures of any one especially desirable field, since with the utmost precautions all of them will not turn out in the same excellent manner, and some will be better that others in most cases. Occasionally, all turn out well, and then there are duplicates for the files.

FILM PROCESSING

Contact with the technicians who develop gastroscopic photographs is extremely desirable. While almost all presently used films are developed in a routine manner, developing solutions must be fresh and some commercial developers seem to use solutions too long, as a matter of economy. A knowledge of what the gastroscopist is trying to photograph, and of the irreplacability of most of his pictures also serves to increase the care with which the work is done. Adequate enlargements and duplicate transparencies are extremely difficult to obtain from commercial sources. The best results must often be obtained by trial and error in the matter of exposure, with the physician selecting the most representative copy.

PHOTOGRAPHIC RECORD FILES

The matter of proper classification and filing may be quite time-consuming in a busy institution, since it is usually necessary for the operator to sort the film, classify the pathology, and set up a teaching file. It is our custom to use a simple code for classification, and to pick out 3 or 4 especially good views for the teaching file in each case. The remainder of the films, properly classified, are sent to the film library and cross-indexed under the patient's name and number. The process should begin early, since it is easy to get behind. All poor films should be discarded at once, or they will accumulate abominably. This warning is given since it is sometimes difficult to part with one's photographic effort, no matter how poor.

Using this system, we have been able to acquire a considerable library illustrating almost all types of gastric pathology, and are adding to it constantly. The library file is a good record of most patients' gastroscopic findings, and the departmental teaching file is proving increasingly useful.

SUMMARY

In the past 5 years, unusual progress has been made in gastroscopic photography. Views of the interior of the stomach may now be recorded routinely and reliably in almost all cases and photography made a part of every gastroscopic examination. Several different types of apparatus are available, all giving good results in experienced hands, but those in which it is possible to focus through the gastroscope prior to taking the picture are felt to be superior for routine work. While electronic flash lamps give the best illumination and allow the use of less sensitive film, the large tungsten lamp with rheostat gives excellent results with presently available more sensitive film. In all cases, the operator must get a clear view through the objective in order to obtain a good picture, and while the apparatus may be made quite automatic, the ability of the gastroscopist in exposing and focusing the field is still the limiting factor.

Gastroscopic photography has now reached the point where it can and should be routinely used in all gastroscopic examinations. We now teach it as an integral part of the procedure. Film libraries may be set up, and demonstration and teaching carried out by means of colored photographs. Study of such photographs is already beginning to clarify characteristics of gastric lesions.

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President's Column (Continued from page 3)

Delay in sending in the cuts and the ads has made the publication late in timing. I believe there are two questions the Society must ask itself again.

1. "Do the members of the Society want a Bulletin of the general type continued?"
2. "Are the members of the Society willing to pay from their dues, from additional assessments, or in some other form for the deficit that will certainly exist between the advertising income and the publication expense?" With a Society membership of 200, five dollars from each member per year would cover this deficit plus increased secretarial and managerial help which is badly needed both for the Chairman of the Editorial Board and the Office of the Editor.

If the answer to the first question is "yes" then by necessity it follows that the Board of Governors must commit the Society to the expense. How is this to be met?

The wishes of the Society are, of course, fulfilled by its elected officers. We are uncertain as to the best future plan to insure the Bulletin's continuous publication. The fall meeting of the Governing Board in November will undoubtedly be concerned with this more than anything else. It would be most appreciated if we could hear from as many members of the American Gastroscopic Society as possible in regard to these problems. Give us a little help by writing the Secretary or any of the officers with some ideas. Where do we go from here?

PAUL L. SHALLENBERGER, M.D.

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WASHINGTON, D. C.

SYMPOSIUM ON NONSURGICAL MANAGEMENT OF OESOPHAGEAL DISEASE

MODERATOR: John Tilden Howard, M.D., Baltimore, Md.

J. T. HOWARD: This Society was founded and, believe it or not, incorporated in The Grea-a-at State of Illinois with the title of The American Gastroscopic *Club*. Its early sessions were characterized by enthusiasm for the then new gastroscopic method and by very informal and argumentative discussions. In those days anyone who talked about the clinical significance of chronic superficial gastritis as he saw it through the gastroscope was prepared to be contradicted from the floor whether he stated that that form of gastritis was significant or insignificant. And a paper on the therapy of gastritis or any other gastric condition, such as polypi, would be supplemented by the assembled company. Indeed, you will notice minor differences of opinion between collaborators, Dr. Asher Winkelstein and myself, in the paper on The Medical Treatment of Hiatal Hernia, Oesophagitis, Oesophageal Ulcer and Diffuse Spasm of the Oesophagus, a paper which I'll read in a moment. (Dr. Winkelstein left a few days ago on a lecturing tour of the Near-East and of Europe. He wanted very much indeed to be with us today, but, speaking literally, he never "misses the boat.")

Editor's Note: *The spelling of oesophageal follows the Old English custom and is correct. In some instances esophageal is used also and is correct. The papers are published as the authors wrote them.*

THE MEDICAL TREATMENT OF HIATAL HERNIA, OESOPHAGITIS, OESOPHAGEAL ULCER AND DIFFUSE SPASM OF THE OESOPHAGUS

Asher Winkelstein, M.D., New York City
and
John Tilden Howard, M.D., Baltimore

For therapeutic discussion, we feel that there is a close relation between symptom-producing hiatal hernia, *peptic* oesophagitis, and oesophageal ulcer; we have treated these conditions rather similarly and they will be considered together, in the main, for remarks about their therapy.

The senior author has pointed out to his junior that the oesophagitis which is associated with hiatal hernia and which is the cause of so many of its symptoms and complications is, generally speaking, *marginal ulceration* adjacent to the hernia. The senior author has also shown that the oesophagitis associated with duodenal ulcer, with simple relaxation of the cardia, after prolonged vomiting or intubation, and following operations on the oesophago-gastric junction is a longer stretch of linear oesophagitis which extends upward from the cardia. He has found that the solitary peptic ulcer of the gullet occurs in an area of abnormal mucosa which is either embryonal columnar epithelium or ectopic gastric secretory tissue.

Let us consider what we will call "the standard treatment" of hiatal hernia initially; we hope that its modifications for peptic oesophagitis and for peptic ulcer of the gullet will be clear.

Almost all patients who have symptom-producing hiatal herniae, sliding or fixed in the chest, and who are seen by the junior author are given a trial, or advised to have a trial, of medical therapy. Patients to whom that author's relation is only consultatory may, we regret to say, fail to have the advantage of

a trial of such treatment at the hands of their practitioner or surgeon; other physicians are not always so medically inclined. The junior author submits to the surgeon for repair only the hiatal herniae which cause massive bleeding repeatedly or chronic anaemia, very large herniae (those in which one-half or more of the stomach has herniated), and those herniae of moderate size in which medical measures have failed to control the symptoms.

The senior author agrees mainly with these indications for surgery. However, he would like to stress the idea that the mere presence of an hiatal hernia, large or small, is not per se an indication for repair. Surgery, he thinks, should be reserved for those patients with intractable symptoms or complications.

What are the medical therapeutic measures which we have found to be of value? Of great importance in the management of hiatal herniae is the reduction of the patient's intra-abdominal pressure by the reduction of his weight, if there is any obesity at all. Many a stoutish person, who didn't concern himself or herself with excessive poundage previously, will restrict his or, more often, her calories when such a medical reason as a symptom-producing hiatal hernia is found. Our surgeons are generally reluctant to replace herniated stomachs in the obese.

In the second place in the medical treatment of hiatal hernia and certainly in all cases of oesophagitis and of solitary peptic ulceration, we put neutralization of gastric acid — preferably to the point of elimination of free HCl. This may be accomplished by giving aluminum gels immediately before and after meals and at bedtime. Or, in refractory cases, the senior author's continuous drip treatment, preferably with Sustagen, into the lower oesophagus may be very worth while.

In the third order of importance is a peptic ulcer type of diet, with low caloric content in the obese. When an hiatal hernia is demonstrable, no food or fluid is given after the evening meal, except antacids taken "straight," in order to have the stomach relatively empty when the patient retires at night.

In the next place is postural therapy. The patient does not lie down directly after eating and, when he is in bed, the head of the bed should be raised at least eight inches or the patient's head and shoulders should be elevated to an angle of at least 30° with the horizontal.

The senior author finds anticholinergic drugs and tranquillizers to be valuable adjuvants. The junior author now rarely prescribes them for patients with symptomatic herniae and peptic oesophagitis, though perhaps he should do so. When he uses one of these, it is the tranquillizer; anticholinergics have seemed to be ineffective. He has felt that the average patient should be given only essential things to do, lest he tire of the treatment. Let us give the patient a few therapeutic suggestions and persuade him to regard them as The Eleventh Commandment and to observe them better than he does the other Ten. We hope that your own experiences with tranquillizers and with anticholinergics will come out in the discussion.

While corrosive oesophagitis is relatively uncommon, we include it here because strictures following the condition are frequently so serious and because the relatively new treatment of acid and alkili burns of the gullet is so promising. The optimistic treatment of such burns is the use of cortisone or one of its modifications. This therapy seems to be relegating to medical history the well known Salzar plan of treatment. This is, as you know, the very early and continuing daily passage of weighted bougies through the injured gullet.

About ten years ago it occurred to thoughtful physicians that the anti-inflammatory effect of cortisone might be useful in preventing fibroblastic reactions to chemical injuries of the oesophagus. And this has worked out rather well in practice *when the steroid hormone has been administered within the first twenty-four to forty-eight hours after the injury and when antibiotics have been given simultaneously to protect against infection.* Such treatment over a period of two or three weeks or until oesophagoscopic examination reveals no

burn has been quite strikingly successful. The doses of hormone vary, of course with the ages and sizes of the patients. The child of four who ingests lye accidentally doesn't receive as much steroid or antibiotic as the adult would-be suicide. In somes series the steroid and antibiotic have been given initally by the intramuscular route and later orally. In others, they have been given orally or through a plastic nasal tube. Often supplementary potassium has been given orally or intravenously. Failures have seemed to come chiefly from delay in starting the hormone, from insufficiency of the steroid doses, from great severity of the burn, and from the well known complications of steroid therapy, complications from which these patients are not exempt.

Lastly, we wish to bring up for discussion the treatment of diffuse oesaphageal spasm. Does anyone of you have a therapeutic programme which is reasonably successful in this condition? We are not therapeutic optimists (inwardly at least) when we attempt to tell a lady with a "corkscrew oesophagus" what to do for that condition. And we have our tongues in our cheeks when we plan the therapy of a man with symptoms from segmental oesophageal spasm. The new and very nice studies of oesophageal motility have, so it seems to us, helped more in the diagnosis of disorders of the motor-functions of the gullet than in their treatment.

From the vewpoint of therapy in this day, oesophageal spasm is either the result of oesophagitis, a reflex manifestation of disease elsewhere, a disorder of oesophageal innervation, or a manifestation of psychic turmoil.

If a cause of oesophageal spasm is not readily apparant, oesophagitis is a condition which must be excluded. Oesophagoscopy is certainly in order, for a small oesophageal lesion may otherwise be overlooked. Rarely, we would apply a therapeutic test for the diagnosis of oesophagitis. That test is the empirical treatment of oesophagitis which might cause spasm, treatment of which we have mentioned previously.

If there is reason to believe that there is extra-oesophageal disease, such at a duodenal ulcer, which might cause oesophageal spasm reflexly, that should be treated.

Should there be a disorder of oesophageal innervation, it is likely to be intractable to therapy. Dilatations with bougies or with pneumatic dilators, nitroglycerine, anticholinergics and sedatives, and local anaesthetics such as Xylocaine Viscous or procaine probably won't be of much use. Yet the patient will want something to be done and these measures may be tried.

Finally, the therapeutic tools which we have just named should be used patiently in succession in a subject with oesophageal spasm which has a psychic basis. The psychiatrists have been of some use to our hysterical dysphagics. Hypnosis has been singularly disappointing. Probably our best therapeutic measure in these patients is one or more dilatations which cause a little pain. Presumably these help by suggestion, suggestion which we certainly do not class as hypnosis. We are inclined to advise with outward optimism a trial of a few dilatations, though we tell the patient's relations that the results are dubious. Nitroglycerine in large doses (gr. 1/75) does seem to help some oesophageal spasm for a few minutes and it is something which we generally try in patients who have spasm which we think comes from a psychic or a neuromuscular disturbance. The physiologists will support us in our statement that nitroglycerine in sufficient dosage will alter the motility tracings. And the side reactions of such a dose of glyceryl trinitrate may be useful by conveying to the patient the idea that he is receiving what is indeed a "powerful medicine." Let us remember, however, that we must be a bit careful when prescribing therapy to make certain that the attempt to cure symptoms doesn't produce others that are worse than the disease. Yes, is it not difficult to imagine anything more distressing than dysphagia when one has a good appetite, a well functioning subdiaphragmatic digestive tract, and is in New Orleans!

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*TREATMENT OF BENIGN STENOSES OF THE ESOPHAGUS**

Edward F. Benedict, M.D.**

Since other speakers have been invited to discuss the medical treatment of hiatal hernia, esophagitis, esophageal ulcer and diffuse spasm of the esophagus, I will confine myself to benign peptic stenosis and caustic stenosis.

BENIGN PEPTIC STENOSIS

This disease is closely related to hiatus hernia, duodenal ulcer, and esophageal ulcer. In a series of 1,000 esophagoscopies[1] Benedict and Sweet encountered 60 cases of benign stenosis in 18 of which there was esophagitis alone, in 34 hiatus hernia, in 20 duodenal ulcer, and in 16 esophageal ulcer. Six of these patients had all three conditions: hiatus hernia, duodenal ulcer, and esophageal ulcer. Further studies of additional patients have been reported by Benedict and Gillespie[2,3]. In a study of 1,340 patients examined in this clinic they found 119 (8.7 per cent) cases of peptic stenosis.

Etiology: All patients with benign stenosis have associated esophagitis. In their book on the esophagus[4] Benedict and Nardi stated their belief that the esophagitis precedes the development of the stenosis and is an important factor in its etiology. Regurgitation of acid peptic secretions undoubtedly plays the most important role in the development of esophagitis and esophageal ulcer. Hiatus hernia is a very common predisposing cause, since it makes regurgitation more likely. In our series 85 per cent of the patients had a hiatus hernia. Forty per cent showed evidence of esophageal ulcer on routine examination. Forty per cent also showed x-ray evidence of present or past duodenal ulcer.

Pathology: Peters[5] has published an excellent and very thorough review of the pathology of severe digestion esophagitis. She discusses the etiology, incidence, and morbid anatomy of 116 severe cases. According to Peters, in the acute stage "the mucosa is invariably shed to some extent . . . discrete shallow ulcers with brown or blood-stained bases may be seen . . . occasionally round or oval, they are more usually linear and follow either the summits or the folds of the lower closure pleats. In more severe cases the whole or part of the tube is mostly hemorrhagic . . . often the whole tube is stripped of epithelium except for scraps at the two ends."

Esophagoscopy: Direct inspection of a benign inflammatory esophageal stenosis usually reveals a smooth conical narrowing with varying degrees of inflammation, depending upon the stage of the disease. Erosions and superficial ulcerations are frequently seen, especially if the disease is very acute. Increased reddening is nearly always present, and there is usually some edema. Denudation of the mucosa is often noted. The inflammatory process may be slight and be localized close to the stricture, or it may be marked and may extend 10 or 15 cm. above the narrowed area. Sometimes a vegetable foreign body or particle of meat is found lodged in the stenotic zone, and this contributes markedly to the esophageal narrowing. Any such foreign body must be removed, bouginage carried out, and a biopsy specimen obtained in order to exclude carcinoma. The site of the biopsy is of very great importance. The specimen should usually be

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Much of the material reported here is taken from "The Esophagus: Medical and Surgical Management," by Edward B. Benedict and George L. Nardi, Little, Brown & Company, Boston, 1958, Courtesy of Little, Brown & Company.

taken from deep within the lumen of the stenotic sector in order to obtain a representative specimen. However, it should be borne in mind that the forceps may be inserted even beyond the stenosed area and hence a noncancerous specimen obtained when the neoplastic tissue is just proximal to the end of the forceps. This, however, happens rarely — and only when the stenotic sector is very short. The biopsy must be taken with great care to avoid perforation. If a pathologic report of chronic inflammation is received and carcinoma is still suspected, esophagoscopy and biopsy should be repeated.

TREATMENT

Dietary treatment: The esophagus is continually subjected to trauma by the passage of food and drink. Unwise eating or drinking may be highly injurious to normal esophageal mucosa and is certainly very traumatic to an already inflamed mucous membrane. Sometimes patients with severe inflammatory stenosis of the esophagus should at first receive intravenous alimentation and be given nothing by mouth. Later on bland liquids and thin cereals may be tolerated. Some fruit juices may be irritating. When the narrowing is not too marked, the patient may tolerate strained vegetables and ground meat. Alcohol and fried or highly seasoned foods should be entirely omitted.

Medicinal therapy: Antacids are useful in the treatment of peptic esophagitis with or without stenosis. Aluminum hydroxide is excellent in either liquid or tablet form such as Amphojel, Creamalin, or Gelusil. Sodium bicarbonate also is useful but cannot be ued over a long period since kidney stones may form. Occasionally there is some spasm in inflammatory diseases of the esophagus; this may be ameliorated by the use of nitroglycerin, grains 1/200, placed dry under the tongue just before a meal. Atropine sulfate usually has little effect in esophageal spasm.

Bouginage: Except in certain intractable cases, treatment for benign stenosis of the esophagus is bouginage. Esophagoscopy should always be carried out in every such case, both in order to carry out bouginage under direct vision and to obtain a satisfactory biopsy specimen. When carcinoma has been excluded and the diagnosis of benign peptic stenosis established, further bouginage may be carried out in the office or in the out-patient department with a previously swallowed thread being used as a guide.

Surgical treatment: The indications for surgery are obstruction, intractable pain, hemorrhage, and perforation — i.e., failure of conservative management. The latter is often difficult to define. The older, poor-risk patient may subsist indefinitely on a regimen of soft bland food and periodic dilatations — a program not usually acceptable to a younger, or more active person.

Prognosis: The prognosis in benign stenosis of the esophagus is very good when palliation by bouginage is attempted. Complete cure by this method is probably infrequent, since some narrowing nearly always remains, as can be demonstrated by x-ray examination. However, many patients are able to eat most foods after a series of such treatments. Surgery, when carried out with meticulous care, particularly with respect to the anastomosis, usually gives good results, but in some cases inflammatory stenosis has recurred at the oesophagogastric anastomosis.

BENIGN INFLAMMATORY POSTOPERATIVE ESOPHAGEAL STENOSIS

Although excellent results have been obtained in many cases after esophageal and gastric surgery, there have been a certain number in which benign inflammatory stenosis occurred postoperatively at the stoma or higher in the esophagus. In a review of 1,938 esophagoscopies we have found 72 such cases occurring as soon as 18 days or as late as 12 years after the initial esophageal or gastric surgery. These cases of stenosis have been found 29 times after gastric surgery and 43 times after esophageal surgery[6].

The study of benign inflammatory postoperative esophageal stenosis is not presented as a criticism of modern esophageal and gastric surgery, but as a reminder that there is room for improvement. Since many cases of benign postoperative esophageal stenosis can be entirely relieved or at least greatly benefited by bouginage, they must not be considered as surgical failures. A few, however, have remained intractable to repeated bouginage and must be classified as poor results for surgery. Does the fault lie in improper selection of cases for surgery, poor choice of operative procedure, poor surgical technic, inadequate postoperative care, lack of cooperation on the part of the patient, or a combination of several factors? In the article referred to above examples are given of cases in which one or more of these factors was of great importance. It is evident that esophageal and gastric surgery should be performed only by very experienced surgeons.

CAUSTIC STENOSIS

In this limited review, I do not need to discuss etiology, pathology, symptoms, complications, or diagnosis. I will, therefore, proceed with treatment.

Esophagoscopy is of limited value in the diagnosis and treatment of caustic burns of the esophagus. In the acute stage it is contraindicated because instrumentation may increase the damage already done, and in the chronic phase the esophagoscopist can see only the upper margin of the most proximal stricture. In a few cases esophagoscopy and bouginage under direct vision is useful.

Van den Ostende[7] claims that esophageal strictures that result from the swallowing of corrosive substances can largely be prevented by treatment with cortisone. He reports only one case, and I myself have not yet had an opportunity to use this treatment. Weisskopf[8] experimentally produced lye burns of the esophagus in dogs; he found that strictures did not develop in the animals treated with cortisone, whereas they did appear in all animals in the control group.

Acute phase: Immediate treatment consists in an attempt to neutralize the chemical. In the case of *alkalis,* vinegar should be given. If *acids* have been swallowed, sodium bicarbonate should be administered. In cases of acid or alkali ingestion the stomach tube should not be used. However, if *bichloride of mercury* has been taken, emptying of the stomach by inducing vomiting or passing a tube as soon as possible after the ingestion of the poison is the most important determining factor in recovery. This should be followed by gastric lavage with a 5 per cent solution of sodium formaldehyde sulfoxylate, of which 200 cc. should be left in the stomach. If this solution is not available, introduce one pint of milk and several eggs into the stomach; this procedure should be followed by lavage with a saturated aqueous solution of sodium bicarbonate. In all cases general supportive treatment is indicated, including external application of heat, morphine if necessary for pain, sedatives as indicated, ephedrine, 25 mm. administered subcutaneously, and Coramine, 5 cc. given intravenously, as necessary for medullary stimulation, parenterally given fluids, and blood transfusions for shock. Nothing should be administered orally as long as nausea and vomiting are present; later olive oil, up to 8 oz., should be given by mouth. Bismuth subcarbonate, taken orally, is a good antidote for burns in the mouth or the oesophagus. As soon as it can be tolerated, water should be given by mouth.

Chronic phase: Very soon after the accident a swallow of thin barium or Dionosil should be given to determine the amount of immediate esophageal damage. If it appears that very little damage has occurred, one must beware of the latent period, which sometimes extends over several weeks or even months before fibrosis and strictures occur. During this period it is advisable to have the patient swallow a thread as soon as possible in order to maintain the patency of the lumen and to have a guide for further bouginage if necessary.

Bouginage: Most esophageal strictures can be successfully treated by dilatation. As long

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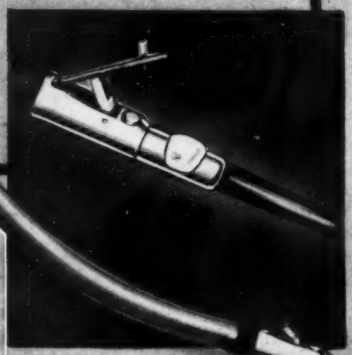

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as progressively larger bougies can be passed, the prognosis is hopeful, but when repeated attempts fail to effect improvement, dilatation should be abandoned. Peroral dilatation using a previously swallowed thread as a guide has been successful in this clinic, which is mostly an adult clinic. In children the problem is sometimes more difficult. Thread swallowing may be accomplished in babies and children with the aid of candy or sugar-coated thread and persistent aid from experienced nurses. In babies, once the thread is anchored in the intestine, peroral bouginage may be attempted in the anesthetized patient, with or without esophagoscopy, but a thread must always be used as a guide. For repeated dilatations in children, however, it is advisable to avoid frequent anesthesia. It is preferable to perform gastrostomy, draw the thread out from the stomach with a tonsil pillar retractor and use retrograde bouginage, tying the bougie to the thread and pulling it upwards through the mouth after the method described by Tucker[9].

If dilatation is carried out too rapidly, hemorrhage, perforation, or mediastinitis may result. If these complications occur, surgery must be considered, but in these days of easy transfusions and antibiotics healing may take place without operation. The endoscopist who is treating stenosis by bouginage should appraise with the greatest care the type and degree of stenosis with which he is dealing and should consider surgical treatment for difficult problems before complications ensue.

Treatment of total atresia: In cases of total atresia of the esophagus, a combination of peroral and retrograde escophagoscopy has been recommended. We believe, however, that this method is very *hazardous* and that modern esophageal surgery is far safer and more satisfactory.

Surgery: Surgical correction of the scarring and stenotic esophageal conditions resulting from caustic ingestion poses a technical problem of considerable magnitude. For further consideration of surgical management, see Benedict and Nardi[4].

Prognosis: Nearly all cooperative patients can be successfully treated by one of the methods of bouginage outlined above. Although some patients enjoy complete restoration of function, others are obliged to live on a restricted diet. Surgery is the treatment of choice in patients with total atresia or in patients whose progress is unsatisfactory after proper bouginage has been attempted.

WEB

Another form of benign stenosis of the esophagus is esophageal web which is a membranous or partially fibrous structure which may extend across the lumen of the esophagus. In a recent study Shamma'a and Benedict[10] analyzed 58 cases of esophageal webs. There were 51 females and 7 males. Forty-eight of the cases involved the upper esophagus. It is usually easy to divulse an esophageal web either with the tip of the esophagoscope or with a bougie. Some of the more fibrous webs, however, may require the use of cutting forceps. Surgery is rarely required.

BENIGN MUCOUS MEMBRANE PEMPHIGUS

In this disease fine thread-like adhesions resembling cobwebs running vertically, obliquely, or transversely may occur in the esophagus[11]. Relief may be obtained by bouginage.

THE OCCURRENCE OF CARCINOMA IN BENIGN STENOSIS OF THE ESOPHAGUS

Joske and Benedict[12] studied 462 cases of benign esophageal obstruction and found carcinoma had developed in 13 such cases. In their series there were 19 webs with 4 carcinomas (21 per cent, 91 x the rate of carcinoma of esophagus in the general population). In 81 cases of congenital esophageal stenosis there was 1 carcinoma (5.5 per cent, not statistically significant). In 58 lye strictures there were 3 carcinomas (5.2 per cent, 22 x incidence of carcinoma in the general population). In 180

cases of achalasia there were 3 carcinomas (1.7 per cent, 7 x incidence of carcinoma in the general population). In 151 cases of peptic esophagitis with stenosis there were 2 carcinomas (1.3 per cent, 6 x incidence of carcinoma in the general population).

CONCLUSION

Most stenoses of the esophagus can be treated by a combination of diet and bouginage. The stenosis should be examined by esophagoscopy using the open-tube method and taking a biopsy whenever there is the slightest suspicion of carcinoma. In fact, a biopsy should almost always be taken. Bouginage can be carried out at the time of esophagoscopy and further bouginage if necessary performed in the office using a previously swallowed thread as a guide. Surgery is indicated if conservative management fails especially if there is intractable pain from an esophageal ulcer or from severe esophagitis, hemorrhage, perforation or obstruction which fails to respond to bouginage. The incidence of benign inflammatory stenosis occurring after surgery of the stomach or esophagus is rather high and emphasizes the fact that the ideal surgical operation for benign stenosis has not been achieved. Caustic stenosis, web, and pemphigus have been briefly discussed and note has been made of the high occurrence rate of carcinoma in the different types of benign stenoses of the esophagus.

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CARDIOSPASM AND ITS TREATMENT

Regis A. Wolff, Pittsburgh, Pa.

An understanding of esophageal structure and physiology is helpful in undertaking the treatment of cardiospasm. The musclature of the upper third of the esophagus is striated, whereas the lower two thirds are of smooth muscle. Primary esophageal waves initinated by swallowing usually cross the junction of striated and smooth muscle located near the level of the aortic arch and sweep down to the inferior esophageal sphincter located about 2–3 cm. above the esophago-gastric junction[1,2]. Secondary waves begin at or just below the striated - smooth muscle junction and travel downward in the same manner as primary waves. Both are true peristalic waves and should the inferior esophageal sphincter repeatedly fail to relax before the onrush of primary and secondary waves the condition of cardiospasm or achalasia exists. Progressively the waves lose amplitude until they disappear entirely in advanced cardiospasm. In severe cases the lower esophagus increases enormously in diameter be-

coming so enlarged and so tortuous as to grossly resemble the sigmoid colon with capacity of about 500 cc. of food and fluid.

The 2–3 cm. long channel running between the inferior esophageal sphincter and the gastric fundus is called the esophageal vestibule[1]. Normally at fluoroscopy barium is seen to flow through this area into the stomach much as water pours from the spout of a hand pump. The ampulla, usually lined with gastric mucosa,[3,4] is an area of high pressure, knows no peristalic waves and is not dilated in cardiospasm. This ampulla is the region toward which mechanical and surgical treatments must be directed in cardiospasm.

Numerous investigators report the degeneration or the lessening of ganglionic cells of Auerbach's plexus in the lower esophagus,[5,6,7] but whether this is acquired or congenital has not been made clear. Vagus nerve influence on the lower esophagus is known to be negligible, witness the rarity of cardiospasm after transthoracic vagotomies. In my experience, before the need for concomitant gastric drainage became known 52 transthoracic vagotomies for duodenal ulcers were done and only 2 cases of cardiospasm developed, both mild and both cleared within several weeks without treatment.

Pain has not been a common symptom in the patients coming under my care. Mid or lower substernal pressure or sticking has been the usual complaint coming on slowly or suddenly during the act of deglutition. On attempting to force down a bolus of food by forceful swallowing or flushing it through with fluids, the results ranged from no relief, to slow partial relief, to a sudden feeling of passage as if a stopper had been removed from the drain of a sink. States of agitation and other emotional unrests can trigger cardiospasm before permanent narrowing develops, but no evidence exists to incriminate cardiospasm as a neurosis.

The aim of treatment of cardiospasm is to gain an adequate passageway for food and fluids into the stomach and this can only be done mechanically or surgically, yet some medications are of value in the stages before advanced fixed narrowing is manifest. Simple sedatives as Phenobarbital and Amytal help in lessening the incidence of spasm episodes whereas antispasmotics do not. Nor is this surprising when we recall that belladonna alkaloids and anticholinergics are expected to block the vagus nerve and it is known that the vagus nerves rarely influence the cardia.

Surgical correction of cardiospasm by the Heller extramucosal esophagocardiomotomy and various modifications of this operation have resulted in relief in up to 90% of reported cases. Former operations usually exposed the lower esophagus to baths of gastric juice with resulting reflux esophagitis. However, in a spirited endeavor to avoid surgery entirely, eighty-eight consecutive cases of cardiospasm have been treated without surgical intervention. A pneumatic dilator is used improvised from several instruments devised by others. For a starter, an Einhorn cardiospasm dilator is dismantled and the terminal metal collars separated by a six-inch gap between which is tied a rubber condom. On the principle of an automobile tire covering an inner tube, a specially made six inch silk bag with narrowed ends is then slipped over the rubber sheath and tied down on the same metal collars. To obtain a smooth surface that can be lubricated and for cleanliness, another rubber sheath is rolled over top the silk bag and tied at both ends. On completion the diameter of the instrument when inflated is 4.5 cm.

Bougies, soft rubber tubes, mercury filled tubes, et cetera, are inadequate for complete treatment as they are incapable of overstretching the cardia. Overstretching is the crux of dilation therapy. The instrument described is compact, needs no water pressure nor wire guide and can be kept in repair by the operator himself. With fluoroscopic guidance, half of the dilating part of the tube is passed into the stomach, the other half remains above the diaphragm. Even without fluoroscopy there is seldom question when the cardia is engaged for should the bag be inflated when it is en-

tirely in the stomach, no distress is experienced. Conversely if the entire inflated bag is in the esophagus above the narrowing, very little substernal distress is noted. But if the balloon is partly above and partly below the cardia, excruciating lower substernal pressure pain is experienced when the air pressure is increased to around 200 mm. of mercury. The younger the individual, the more the tissue elasticity; hence, more vigorous dilations are needed. At ages below forty, the pressure is quickly taken to 300 mm. of mercury which makes the bag almost as firm as a bicycle tire. Above the age of forty the pressure is taken to 200 mm. of mercury and slowly increased to 250 mm. during the first treatment. Pressure at the next treatment is raised to 300 mm. Four treatments at weekly intervals for three minutes each are usually found sufficient. Fresh red blood streaking on the bag is expected with the first and sometimes all of the treatments as deliberate attempts are made to cause overstretching which often result in mucosal splits. Such splits usually do not require treatment, and we have not as yet had any cases requiring surgical repair. Liquid foods are allowed on the day of treatment and solid foods the following day. Patients are instructed to return for follow-up treatments if persistent substernal sticking recurs. Many patients followed up to fifteen years have needed no further treatments. Incidentally, megaesophagus does not shrink appreciably after treatments.

In treating a series of 88 cases some have required all the patience, acquired know-how and stubborn perseverance I could muster. When the lower esophagus has the contour of a bowl, probing for the cardia and successfully passing a dilator has not always been easy. However, to date, no cases have required surgical intervention.

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